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Indian Textile Industries Towards Energy Efficiency Movement

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ABSTRACT

Textile sector may be considered as one of the largest industrial sector in India and at the same time it is also one of the oldest sectors in the country. Even after a lot of technological development globally, most of the mills are using the same old technology. Although for the last few years process of modernization in textile industries are underway but still the pace is slow. In order to accelerate the pace of energy efficiency activity in the country, Government of India has enacted the "Energy Conservation Act" in the year 2001. Under this act, the Textile sector has been identified as one among fifteen most energy intensive sectors in India. The fact is that more than 95% of the total cloth produced in the country is contributed by the decentralized or unorganized textile sector. So, in order to include major players of textile sector as well as other energy intensive industries for energy efficiency movement, Perform Achieve & Trade (PAT) scheme under National Mission on Enhanced Energy Efficiency (NMEEE) program has been launched by Bureau of Energy Efficiency, Government of India. Here, the present paper will provide an overview of the Indian Textile industries in energy efficiency context along with some basic energy efficiency measures for their betterment.

Keywords- Industry, Textile, Energy, Efficiency, Policy, PAT,

1.INTRODUCTION

Textile Industry in India is one of the vital components of the Indian economy and contributing around 14% of total industry production, about 4% of India's Gross Domestic Product (GDP), about 17% of the gross export earnings and employing about 35 million people being the second largest provider of employment after agriculture. Taking the installed capacity of spinning machinery only, it ranks second (with 19.6% of total spindles globally), after China. Indian textile industries can be categorized into two basic categories, i.e. Organized sector and decentralized sector. Organized sector includes the spinning mills and the composite mills. Whereas decentralized sector constitutes of handloom sector, power loom sector, hosiery, fabric processing sector, etc.

Taking energy prospective, textile industry consumes significant amount of thermal as well as electrical energy. The basic consumption of thermal energy is in chemical processing of fibre, yarn and fabric whereas the electrical energy is being consumed in spinning and weaving sections. Thermal energy consumption in a fabric process house is 70-80% of the total energy consumption of a processing unit. The major energy consumption sources in any textile industries are Ring Frame, Humidification Plant, Stenter, Mercerizer, Cheese Winding- TFO, Sanforizer, etc.

Indian textile industry is the longest industrial chains in the category of manufacturing industry which is having production of diverse outputs. This disintegration and heterogeneity make it very difficult to club same profile of industries and to compare Indian practices with international norms. Even it is also very much difficult to compare different industries having same profile within India. The main reason behind this is the dependency of market in this sector. Products are very diverse and quality of products varies with type of fibers used, count, loom width, different colors and the process being used for different types of fabrics or different process for same type of fabric.

Indian textile industry has lagged behind other industrial sector in terms of modernization. Most of the Textile industries are using old technologies. Earlier the main focus of the textile industries was only to make product which was in demand in the market without concerning about the energy input but in recent years, we can sense a trend of modernization of textile machinery due to the globalization of textile business. Many industries are trying to adopt the latest technologies available in the market along with implementation of energy efficiency measures. If we compare the modern textile industries with older textile industries, the specific energy consumption is higher in modern textile units than that of older units. The modernization also results as less utilization of man power and replacing it with electrical power. Overall, we can say that most of the textile industries are market driven and most of the time they suffer with the financial crisis. This

results the industries to think about increasing the production only rather than going for any other technological development or implementation of any type of energy efficiency projects.

2.TEXTILE SECTOR UNDER PAT SCHEME

Looking on the need of energy efficiency in the textile sector, Government of India has included this sector as one of the energy intensive sector under the Energy Conservation Act 2001. The Government has also notified the threshold limit to become a designated consumer for 8 industrial sectors of India. In March 2012, Bureau of Energy Efficiency has launched a scheme named Perform Achieve & Trade (PAT) which includes the industrial sectors of India namely Power Plant, Cement, Aluminium, Iron & Steel, Textile, Pulp & Paper, Chlor & Alkali and Fertilizer. From these 8 industrial sectors 478 units have been identified as designated consumers and have been given a total target of 6.6 Million Tonne of Oil equivalent which is to be saved by 2014-15. For becoming a designated consumer in Textile sector, the threshold limit is 3000 mtoe (Metric Tonne of Oil Equivalent). This means any Textile unit which is consuming energy more than 3000 mtoe will be considered as designated consumer and will be included in the PAT scheme. BEE has selected 90 units as designated consumer in textile sector under the first PAT cycle. The target reduction for this sector is 66000 Tonne of oil equivalent. For the first PAT cycle, BEE has taken the production and the energy consumption figure for the year 2007-08 to 2009-10 for these designated consumers and based on these values the Baseline SEC (Specific Energy Consumption) and the target SEC has been calculated and notified. These 90 DCs have been divided into four sub groups namely Processing, Spinning, Composite and Fiber. The groups have been divided based on the processes the designated consumers are using. The energy consumption and the target for reduction for these four sub groups are shown in Fig1.

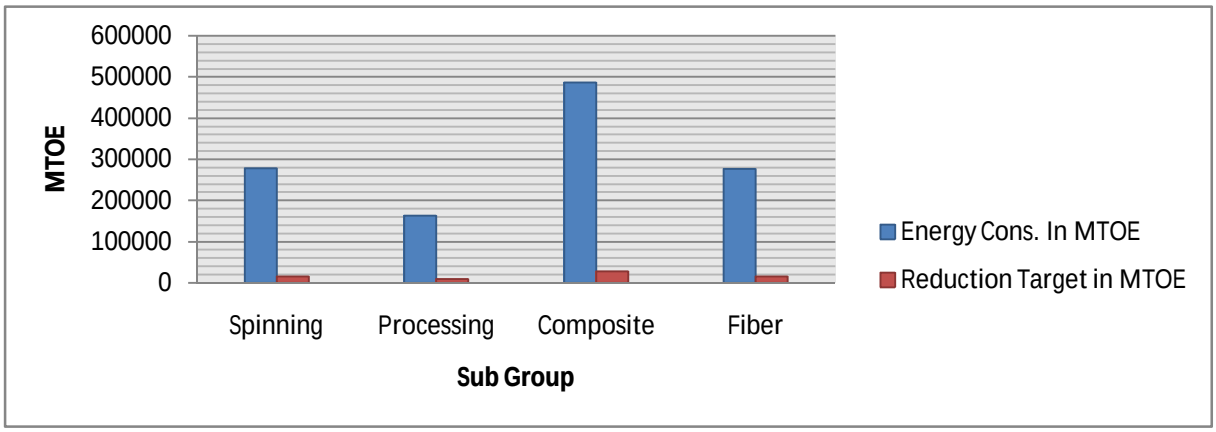

Fig1. *Energy consumption in different sub-groups*

As depicted in the Fig 1, the energy consumption in Composite sub group is maximum so the option for target reduction is highest in Composite sub group. Processing sub group is the least energy consumer so the target assigned to them is least in these different sub groups. The number of DCs and % reduction target in each sub group is given below in Table1.

Table 1. *Target range assigned under different sub-groups*

Sub-sector	No. of DCs	Target Range
Processing	20	1.63 % to 7.31 %
Spinning	37	2.07 % to 9.93 %
Composite	27	1.62 % to 9.8 %
Fibre	06	5.72 %

The composite sub group consist lesser no. of units (27 DCs) as compared to Spinning sub group (37 DCs) but most of the DCs in composite sub group are major players.

Further, to see a bandwidth of the textile industries, if we compare the Minimum and Maximum values of SEC in each sub group (Fig 2), then we can conclude that the differences in Composite sub group is very high. This is due to the fact that among 27 DCs, some of the DCs are very efficient units and some are very

inefficient units. The target for reduction in SEC in these inefficient units is on higher side as compared to efficient units which is having very less target.

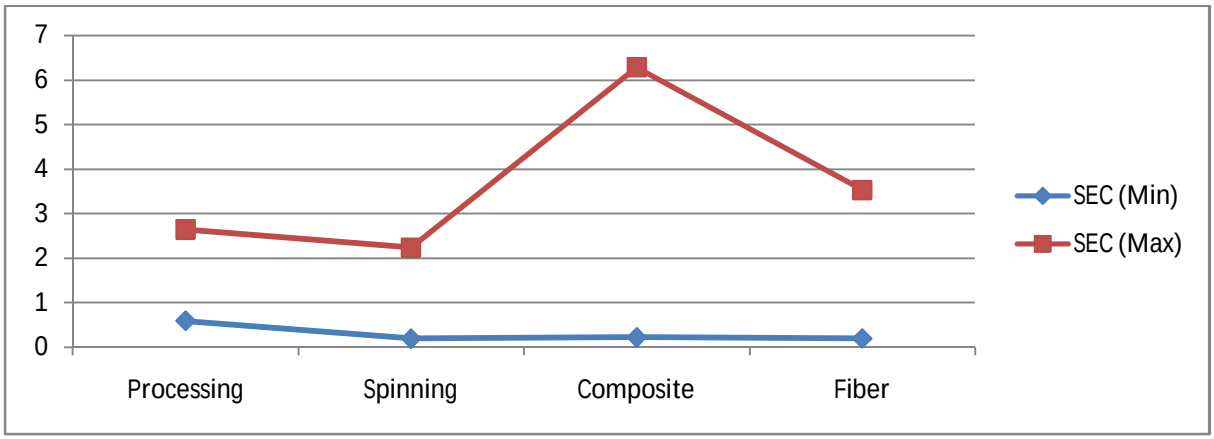

Fig 2. *SEC range under different sub-groups*

Under this PAT scheme, the target has been given to each DC for reduction in their Specific Energy Consumption (SEC) and asked to achieve the target assigned to them by the year 2014-15. The uniqueness of this scheme is that if any DC achieves more than the target assigned to them then they will be awarded with Energy Saving Certificates (ESCerts) which they can trade in the market. But if they are not able to achieve the said target within the given time periods then they have to pay penalty equivalent to the amount of energy which they are not able to achieve. This scheme is one of the first mandatory schemes for energy efficiency improvement in the industrial sector.

An analysis on the expected energy savings from the textile industries of different states of India (Table2) have also been undertaken and it is found that the major potential of the energy saving under PAT scheme can be expected from the states like Rajasthan, Gujarat and Madhya Pradesh. It is expected to achieve the energy saving of around 0.66 million ton of oil equivalent from all the textile industries covered under this scheme.

Table 2. *Expected energy savings from different states*

S. No.	States	No of DCs	Total Saving (in TOE)
1	Andhra Pradesh	1	304
2	Gujarat	11	16018
3	Haryana	2	1302
4	Karnataka	2	980
5	Madhya Pradesh	6	11561
6	Maharashtra	14	9015
7	Punjab	11	4796
8	Rajasthan	31	18471
9	Tamil Nadu	5	918
10	Himachal Pradesh	7	2648

3.OPPORTUNITIES FOR IMPROVEMENT

The common measures for the energy conservation and energy efficiency in the textile industries are high capacity utilization, fine tuning of equipment's and technology up gradation and other kind of re-engineering initiatives. Apart from this following are few important energy efficiency measures which is specific for sub-groups and are in very much practice in Indian textile industries.

Table3. *Innovative projects for different processes*

Spinning	**1.** Using automatic power factor correction system with capacitors **2.** Replacement of in efficient motors in Ring Frame, Open End & other spinning machines

	3. Photocell for Speed Frame **4.** Using synthetic flat belts in ring frames
Weaving	**1.** Replacement of V-belt drives to flat belt **2.** Replacement of old machines with new ones **3.** Replacement of Fans in Humidification Plant **4.** Use of controller for air pressure
Processing	**1.** Replacement of conventional rapid jet dyeing machine with low liquor ratio jet dyeing machine **2.** Steam dryer with RF dryer for dyeing yarn **3.** Recovery and reuse of waste water in fabric dyeing

4.CONCLUSION

Overall, these 90 designated consumers of textile sector covered in the PAT scheme are going to save a substantial amount of energy by 2014-15 which will directly provide a benefit in terms of reduction of CO2 emission by approximately 0.35 million ton per year. It is also expected that in future more number of industries can be considered under the scheme by reducing the threshold limit of the particular sector which will further strengthen the energy efficiency movement in the textile industries.

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